

A REVISION OF *ACANTHOMINTHA OBOVATA*  
(LAMIACEAE) AND A KEY TO THE  
TAXA OF *ACANTHOMINTHA*

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ABSTRACT

A reevaluation of *Acanthomintha obovata* indicates that subspecies *duttonii* is more appropriately recognized as a species, and that material previously referred to as subspecies *obovata* is comprised of two geographically and morphologically distinct subspecies. Nomenclatural innovations are published with a key to the species and subspecies of *Acanthomintha*.

The distinctive Lamiaceae genus *Acanthomintha* A. Gray ex Benth. & Hook. consists of four species endemic to central and southern California, USA, and northern Baja California, Mexico (Fig. 1). The genus has not been monographed or the subject of published taxonomic or ecologic inquiry.

Herbarium studies for the Jepson Manual project indicate the need to revise the taxonomy of *A. obovata* Jepson. Traditionally, *A. obovata* has been treated as consisting of subsp. *obovata* and *duttonii* Abrams (Abrams 1951; Munz 1959, 1974). Morphologic characteristics and geographic distributions indicate that subsp. *duttonii* should be elevated to full species status and *A. obovata* sensu stricto is divisible into two subspecies. These changes are presented below with supporting observations and other notes. The article concludes with a key to currently recognized taxa of *Acanthomintha*.

1. *ACANTHOMINTHA DUTTONII* (Abrams) Jokerst stat. et comb. nov.  
*A. obovata* Jepson subsp. *duttonii* Abrams. Illustrated Flora of the Pacific States. Vol. III: 635. 1951.—TYPE: USA, California, San Mateo Co., "Woodside serpentine", 17 April 1900, H. A. Dutton 63392 (holotype, CAS!).

Stem 0.4–2 dm tall; typically unbranched but most populations with some plants branched at base; upright or decumbent at the base; glabrous or sparsely hispidulous. Leaves 8–12 mm long (excluding petiole), lance-oblong to obovate, entire or serrate, teeth not armed with acicular spine. Inflorescence generally capitate, 1 per stem, occasionally the uppermost leaf axils will also produce small flower clusters; bracts 5–11 mm long (excluding spines), 4–11 mm wide, ovate but slightly longer than wide, green or less commonly

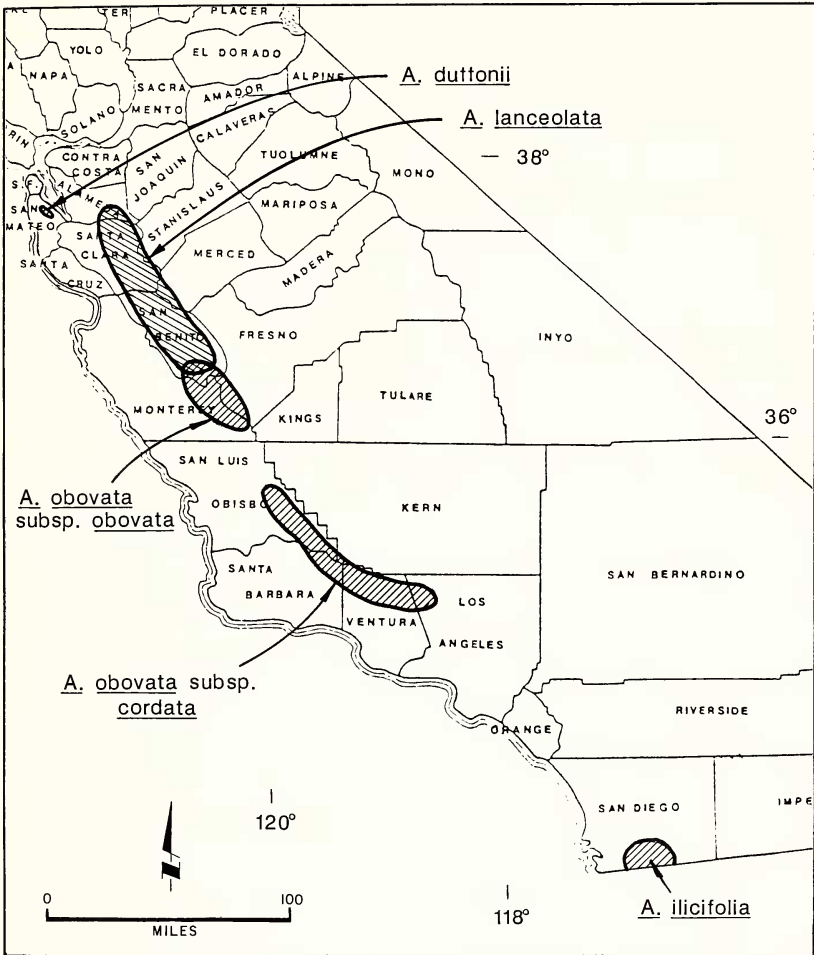


FIG. 1. Generalized distribution of *Acanthomintha* taxa in California.

straw-colored during anthesis, armed with 5, 7, or 9 marginal spines. Calyx 5–8 mm long, outer surface glabrous or microscopically hispidulous, inner surface of calyx teeth sparsely hirsute; acicular teeth of lobes 0.5–1.5 mm long. Corolla 12–16 mm long, white, lower lateral lobes occasionally lavender and the central lobe rose-lavender; upper lip erect, slightly hooded over stamens, entire; lower lip reflexed at 90-degree angle to the tube, three-lobed. Stamens glabrous, upper 11–15 mm long, lower 9–14 mm long; anthers glabrous, pink-red; pollen cream. Style 11–16 mm long, glabrous.

*Geographic range.* Endemic to San Mateo County (Smith and Berg 1988); never collected beyond a narrow, 6-mile-long strip from Low-

er Crystal Springs Reservoir south to Woodside (Fig. 1). Reported extant at two sites separated by ca. 1 km in and adjacent to Edgewood Park (Bittman, personal communication). Disjunct ca. 185 km from the nearest *A. obovata* in San Benito and Monterey counties east of King City. *Acanthomintha lanceolata* occupies the south Coast Range foothill region separating *A. duttonii* and *A. obovata*.

*Habitat.* Slopes and flats with deep, heavy-clay soil inclusions surrounded by the more typical rocky serpentine soil. Reported from slopes, depressional areas, and vernal pools. The heavy-clay soil inclusion at the Edgewood Park site supports a species-rich forb association that distinguishes the site from the surrounding serpentine grasslands and supports *Agoseris heterophylla*, *Calochortus albus*, *Delphinium variegatum*, *Holocarpha virgata*, *Lotus micranthus*, *L. subpinnatus*, *Lolium multiflorum*, *Orthocarpus lithospermoides*, *O. purpurescens*, *Sidalcea malvaeflora*, *Stipa pulchra*, and *Trifolium fucatum* (taxonomy according to Munz 1959).

*Relationships.* *Acanthomintha duttonii* is most closely related to *A. obovata* and *A. ilicifolia* A. Gray. The three species have the same habit and corolla shape and each has a glabrous style. Important characteristics shared by *A. duttonii* and *A. obovata* include four stamens with hairy or woolly anthers and growth habit. Other characteristics that *A. duttonii* and *A. ilicifolia* share include cordate or truncate bract base; glabrous or sparsely hispidulous stems, leaves, and calyces; calyces less than 8 mm long; and sparse, villous-hispid anthers. *Acanthomintha ilicifolia*, with 2 stamens and glabrous anthers, is disjunct ca. 250 km miles south of the nearest *A. obovata* station in Los Angeles County.

*Acanthomintha duttonii* differs from *A. obovata* and other congeners in the absence of acicular marginal spines on the upper leaves; pink-red anthers; and generally unbranched habit with a solitary capitate flower cluster per stem. These morphological differences and the wholly discrete geographic range of the populations support their status as a species.

*Legal status.* *Acanthomintha duttonii* is listed as endangered under both the California and federal Endangered Species Acts (ESAs). The larger occurrence in Edgewood Park is threatened by urban development.

*Exsiccatae.* USA, CA, San Mateo Co.: Woodside serpentine, 17 April 1900, *H. A. Dutton 63392* (holotype, CAS!); Crystal Springs Reservoir, May 1903, *A. D. E. Elmer 4538* (CAS!, UC!); near Menlo Golf Club, small area in sandy soil on hillside sloping to the S, 26 and 29 May 1915, *H. A. Dutton 3819* (CAS!, UC!); serpentine back of Redwood City, 2 June 1920, *H. R. Davis 182* (CAS!); serpentine

back of Redwood City, 1 July 1920, *L. R. Abrams 7500* (CAS!); open grassy hill above upper Emerald Lake, 24 May 1929, *C. B. Wolf 3723* (CAS!, UC!); Emerald Lake area, 21 April 1930, *D. K. Gillesfice 9220* (CAS!); Redwood Hills, 17 May 1933, *L. S. Rose 331171* (CAS!, UC!); Emerald Lake, 100 m, dry rain pool, 28 May 1936, *L. S. Rose 36303* (CAS!); Emerald Lake west of Redwood City, 15 May 1940, *D. D. Keck 5034* (CAS!, UC!); Redwood City Hills, 20 May 1941, *R. F. Hoover 5110* (UC!); near Crystal Springs Reservoir near Hwy 92, 16 April 1972, *J. H. Thomas 16065A* (CAS!); serpentinized slope east side of Upper Crystal Springs Reservoir, below and west of state hwy interchange, 16 April 1972, *L. Heckard 2903* (JEPS!).

2. *ACANTHOMINTHA OBOVATA* Jepson, Man. Fl. Pl. Calif. 873. 1925.  
See subspecies headings for typification.

Stem 0.4–3 dm tall; branched at base or simple; glabrous, or sparsely to conspicuously hispidulous, with or without conspicuous villous glandular and eglandular hairs. Leaves 8–12 mm long (excluding petiole), lance-oblong, ovate, or obovate, hispidulous or villous with glandular and eglandular hairs; margin of the lower entire or serrate, those subtending flowering bracts with acicular spines on teeth. Inflorescence capitate and axillary; bracts 7–15 mm long, shiny, straw-colored at anthesis, glabrous or hispidulous, armed with 7, 9, or 11 marginal spines, 5–8 mm long. Calyx 7–13 mm long, hispidulous or villous with glandular and eglandular hairs, teeth conspicuously hirsute within, armed with acicular spines 1.5–3.5 mm long. Corolla 12–27 mm long, glabrous or finely pubescent, white, occasionally tinged lavender; upper lip erect, slightly hooded over stamens, entire; lower lip reflexed at 90-degree angle to the tube, three-lobed. Stamen filaments glabrous, upper 14–27 mm long, lower 15–23 mm long; anthers moderately to densely woolly, yellow; pollen cream. Style glabrous.

2a. *ACANTHOMINTHA OBOVATA* Jepson subsp. *CORDATA* Jokerst subsp. nov. — TYPE: USA, California, Ventura Co., Wagon Canyon Rd., 14 June 1956, E. C. Twisselmann, 2986 (holotype, CAS!; isotypes, CAS! [2 sheets]).

Caulis glaber hispidulusve. Folia supra spinis acicularibus in marginibus. Inflorescentia in fasciculis capitatis et axillis. Bractee late-ovatae, cordatae-amplexus ad basim. Calyx glaber hispidulusve, dentes hirsuti interius. Anthera lanatae.

Stem 0.4–2.5 dm tall; generally branched at base, occasionally unbranched; glabrous or sparsely hispidulous, sometimes visible only under magnification. Bracts of inflorescence 7–15 mm long, 6–16 mm wide, broadly ovate, generally slightly wider than long, base

cordate-clasping, glabrous or hispidulous. Calyx 9–13 mm long, glabrous or sparsely hispidulous. Anthers moderately to densely woolly.

*Geographic range.* Western Transverse Ranges in northwest Los Angeles, southeast San Luis Obispo, northern Ventura, and eastern Santa Barbara counties (Fig. 1). *Acanthomintha ilicifolia* occurs 250 km south of subsp. *cordata*. Subspecies *cordata* is (Fig. 1) disjunct ca. 115 km south of the nearest reported subsp. *obovata* population near Parkfield, Monterey County. Judging from the uniformity of vegetation and climate, additional populations of either *A. obovata* subspecies could be located in the area separating them, unless their distributions are limited by edaphic or geologic factors.

*Habitat.* Heavy adobe-clay soil (probably a Vertisol) of hillside slopes, saddles, and ridges, which desiccates by early June, cracking into large polygonal blocks. Grassy openings in woodlands of *Quercus douglasii* Benth., *Pinus sabiniana* Dougl., *Juniperus californica* Carr., and *Pinus monophylla* Torr. & Frem., also reported from chaparral openings (Smith 1976).

*Relationships.* Subspecies *cordata* closely resembles subsp. *obovata* in all morphological features except bract shape and stem, calyx, and anther vestiture. Subspecies *cordata* lacks gland-tipped hairs, and has glabrous or sparsely hispidulous stems and calyces, moderately to densely woolly anthers, and broadly ovate bracts that are generally as wide as they are long with cordate-clasping bases. Subspecies *obovata*, in contrast, always has some gland-tipped hairs, densely hispidulous stems and calyces that may or may not also have villous hairs, sparsely to moderately woolly anthers, and narrowly ovate bracts that are wider than long with truncate or obtuse bases. Although the vestiture traits are consistent among the specimens examined and have a strong geographic component, they are not substantial enough to warrant recognition of these clusters of populations above the subspecies level.

A Karen Brandegee collection from western Fresno County (s.n., 11 May 1916, west of summit between Coalinga and Parkfield, UC!) is the only specimen that had intermediate traits between the two *obovata* subspecies. Only one plant of the collection has villous hairs; the remainder have sparsely hispidulous stems and calyces that resemble subsp. *cordata*. This collection is assigned to subsp. *obovata* because of its bract shape, the presence of some plants with villous hairs, and its location at the south end of the range of subsp. *obovata*. A collection from a dry hillside west of Coalinga (Condit s.n., 13 June 1910, UC!) presumably from the vicinity of the Brandegee collection, is typical of subsp. *obovata*. Field studies may reveal that the ranges of the two subspecies overlap in the region.

*Legal status.* Neither subsp. *obovata* nor *cordata* have legal status under state or federal ESAs. Subspecies *obovata* is considered a plant of limited distribution by Smith and Berg (1988). At a minimum, subsp. *cordata* warrants the same status. Both subspecies are poorly represented in herbaria. The relatively narrow range of subsp. *cordata* and small number of populations indicates it should be considered for inclusion on the California Native Plant Society's list of rare or endangered species (List 1b in Smith and Berg 1988). Threats to the species have not been evaluated. Possible threats include grazing and off-road vehicles. Both subspecies should be evaluated and periodically monitored to determine threats and need for legal protection.

*Exsiccatae.* USA, CA, Los Angeles Co.: Tejon Pass on route toward Castaic off Hwy 99 S and above Oso Canyon, 13 June 1962, *S. M. Kaune* 385 (CAS!). Ventura Co.: 24 km W of Frazier Park, *A. M. Vollmer* 11 (CAS!); Wagon Canyon Rd, 14 June 1956, *E. C. Twisselmann* 2986 (CAS!); branch of Ballinger Canyon near its summit, 7 June 1955, *E. C. Twisselmann* 2127 (CAS!); Wagon Canyon Rd approaching Lockwood Valley, 22 June 1949, *H. M. Pollard s.n.* (CAS!); near S base of Mt Pinos 16 km W of Lockwood Valley along Ozena-Lebec Rd, 19 June 1935, *R. Bacigalupi* 2353 (CAS!, UC!); 1.6 km S of Lockwood Valley on road to Thorn Meadows, San Emigdio Range, 12 May 1962, *D. E. Breedlove* 2734 (CAS!); upper Lockwood Valley, 25 June 1896, *W. R. Dudley* 4679 (CAS!, UC!); Lockwood Valley, 18 July, 1905, *H. M. Hall* 6698 (UC!). San Luis Obispo Co.: La Panza District, 30 April 1950, *R. F. Hoover* 7862 (CAS!, UC!); T32S, R19E, S14, 4.2 km W of Painted Rock, 31 May 1957, *P. L. Johannsen* 1179 (UC!), E slope of Caliente Mtn, 820 m, 3 May 1957, *E. C. Twisselmann* 3468 (CAS!).

2b. *ACANTHOMINTHA OBOVATA* Jepson subsp. *OBOVATA*.—TYPE: USA, California, San Benito Co., "Lorenzo Creek", 12 Jun 1922, *Bettys s.n.*, (holotype, JEPS! isotypes, JEPS! [2 sheets]).

Stem 0.4–3 dm tall, generally branched at base; hispidulous, with or without glandular and eglandular villous hairs. Inflorescence bracts 8–13 mm long, 4–11 mm wide (excluding spine), generally longer than wide, base truncate or obtuse, hispidulous, with or without villous glandular and eglandular hairs. Calyx 7–12 mm long, hispidulous, with or without glandular and eglandular hairs. Anthers moderately woolly.

*Geographic range.* South Coast Ranges in southern San Benito, western Fresno, and southwestern Monterey counties (Fig. 1). Southern station in Parkfield, Monterey County, ca. 115 km north of the nearest recorded subsp. *cordata*.

*Habitat.* Based on herbarium specimen label data, *A. obovata* subsp. *obovata* is roughly similar to subsp. *cordata*, that is grasslands with adobe-clay soil, including openings in oak woodland and chaparral.

*Relationships.* Refer to above discussion for relationship with subsp. *cordata*. Subspecies *obovata* has two notable forms distinguished by the presence or absence of conspicuous villous hairs on the stems, leaves, bracts, and calyces, some of which are glandular. Based on herbarium specimens, the villous form appears to be less prevalent than the hispidulous form. The holotype of subsp. *obovata* is hispidulous while one of the isotypes is villous. The villous isotype is annotated by Jepson's hand as "*A. vilosa* n. sp."; the name was never published.

*Legal status.* See discussion above under subsp. *cordata*.

*Exsiccatae.* USA, CA, Fresno Co.: W of Coalinga, 13 Jun 1910, *Condit s.n.* (UC!); W of summit between Coalinga to Parkfield (UC!, JEPS!); 11 May 1916, *K. Brandege s.n.*; divide at head of Los Gatos Creek, 7 Jun 1927, *W. L. Jepson 12185* (JEPS!); W of Alcalde, 12 Jun 1915, *H. M. Hall 10029* (UC!). Monterey Co.: Priest Valley, 11 May 1936, *L. S. Rose 36290* (CAS!); summit of Mustang Ridge between Priest Valley and Long Valley, May 1952, *G. L. Stebbins 5048* (CAS!); E of Mustang Grade near Priest Valley, 11 May 1936, *J. T. Howell 2466* (CAS!). San Benito Co.: Bettys Ranch, 18 May 1919, *H. A. Walker 5094* (CAS!); 14.7 km from junction, N of Bitterwater on road to New Idria, 11 May 1957, *P. Raven et al. 10815* (CAS!); near Harrison's, Hernandez, 1 Jun 1899, *W. R. Dudley s.n.* (CAS!); near Hernandez, 17 Aug 1933, *J. T. Howell 11547* (CAS!); summit between Hernandez (Laguna) and Hernandez Valley, 1 May 1933, *D. D. Keck 2046* (CAS!); NE of San Antonio Mission, E of Pine Canyon Rd, 28 May 1962, *C. B. Hardham 10372* (CAS!); 18.3 km from Hernandez on road to San Benito, 29 Mar 1931, *J. T. Howell 6020A* (CAS!); near Hernandez, 17 Aug, 1931, *J. T. Howell 11547* (CAS!); Lorenzo Canyon along Hernandez Valley ca. 13.3 km W of Bitterwater, 13 May 1925, *J. A. Bettys s.n.* (CAS!); Lorenzo Canyon along Hernandez Valley ca. 13.3 km W of Bitterwater, May 1919, *J. A. Bettys s.n.* (UC!, JEPS!); Lorenzo Creek, 12 Jun 1922, *J. A. Bettys s.n.* (holotype, two isotypes, CAS!).

#### NOTES ON *ACANTHOMINTHA*

The genus *Acanthomintha* is ideally suited for evolutionary and ecological studies because the morphologically distinct species each have narrow geographic ranges and occur in small, isolated populations. The isolated nature of populations likely relates to the affinity of *Acanthomintha* species for edaphically peculiar habitats.

*Acanthomintha lanceolata* Curran, the most distinctive *Acanthomintha* species, occurs on arid, rocky slopes, most often on serpentine and less frequently on shale, basalt, and other bedrock types. In contrast, the closely related triad of *A. ilicifolia* A. Gray, *A. duttonii* (Abrams) Jokerst, and *A. obovata* Jepson are reported from heavy, clay-rich soils on various geologic formations and soil series.

*Acanthomintha ilicifolia* of coastal mesas in San Diego County and northern Baja California is primarily associated with vernal pools. Open grasslands on serpentine formations in San Mateo County support *A. duttonii*, although a collection by L. S. Rose (36063 CAS!) is from a "dry winter pool". A couple *Acanthomintha obovata* herbarium collections are reported from vernal pools, but most labels indicate a strict preference for heavy-clay soil.

The nomenclatural changes proposed above are summarized and contrasted with other taxa in the following key to *Acanthomintha*.

#### KEY TO THE GENUS *ACANTHOMINTHA*

- a. Stem conspicuously and densely villous, most hairs gland-tipped; aristate calyx teeth 5–7 mm long; style hairy; corolla lips more or less equal, upper lip 2-lobed, deeply hooded over stamens; anthers glabrous or sparse-hirsute. . . . . *A. lanceolata* Curran
- a'. Stem glabrous, hispidulous, or villous, gland-tipped hairs only present in *A. obovata* subsp. *obovata*, and these uncommon; aristate calyx teeth 1–3.5 mm long; style glabrous; lower corolla lip > than upper, upper lip entire, shallowly-hooded over stamens; anthers glabrous or woolly.
  - b. Fertile stamens 2, anthers glabrous; San Diego Co. and Baja California. . . . . *A. ilicifolia* (A. Gray) A. Gray
  - b'. Fertile stamens 4, anthers hairy to woolly; South Coast and Transverse ranges.
    - c. Anthers pink-red with cream-yellow pollen, sparsely hispidulous; leaves subtending bracts lacking acicular spines on teeth; stem generally unbranched and erect at base with a solitary, capitate head of flowers, San Mateo Co. . . . . *A. duttonii* (Abrams) Jokerst
    - c'. Anthers cream-yellow with cream-yellow pollen, woolly; leaves subtending bracts with acicular spines on teeth; stem generally branched at base with flowers in capitate and axillary clusters; South Coast and Transverse ranges from southern Monterey and San Benito counties to Los Angeles Co. . . . . subsp. *obovata* Jepson
    - d. Stem and calyx with some gland-tipped hairs, densely hispidulous, with or without villous hairs; anthers sparsely to moderately woolly; bracts slightly longer than wide, obtuse or truncate at the base; western Fresno, eastern Monterey, and San Benito counties. . . . . subsp. *obovata* Jepson
    - d'. Stem and calyx lacking gland-tipped hairs, glabrous or sparsely hispidulous; anthers moderately to densely woolly; bracts circular or wider than long, cordate clasping at base; northwest Los Angeles, southeast San Luis Obispo, and northern Ventura counties. . . . . subsp. *cordata* Jokerst

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